

Mathieu Bazinet

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EDUCATION

Ph.D. in Machine Learning 2023-
Université Laval, Québec, Canada

- Supervised by Pascal Germain and Valentina Zantedeschi.
- Research project: A study of new representation learning algorithms through the lens of generalization bounds.
- Finished coursework with a Laval score of 4.33/4.33.

Master in Computer Science 2022-2023
Université Laval, Québec, Canada

- Supervised by Pascal Germain.
- Research project: Sparse wavelet-based representation learning techniques for machine learning.
- Graduated with a Laval score of 4.06/4.33.
- Participated in the Ph.D. fast track program.

Bachelor in Mathematics and Computer Science 2019-2022
Université Laval, Québec, Canada

- Graduated with a Laval Score of 4.00/4.33.
- Participated in the integrated master's program.

PUBLICATIONS

1. **Bazinet, M.**, Zantedeschi, V., Germain, P. (2026) Bound to Disagree: Generalization Bounds via Certifiable Surrogates. In *Proceedings of the 42nd Annual Conference on Uncertainty in Artificial Intelligence*.
2. Mafotang T., L.C., **Bazinet, M.**, Cournoyer, A., Fidaleo, M., Bazinet, L. (2026). Effects of pulsed electric field parameters on anionic peptide migration during Electromembrane separation of a whey protein hydrolysate: A machine learning comprehensive study. *Food Research International*, 241, 119562.
3. Fliss, H., **Bazinet, M.**, García-Vela, S., Thibodeau, J., Bazinet, L., Mikhaylin, S. (2026). Valorization of turkey cruor through peptic hydrolysis: peptidomics and machine learning approaches for the identification of antimicrobial peptides. *Food Chemistry*, 516, 149124.
4. Rahimi, D., **Bazinet, M.**, Sanchez-Reinoso, Z., García-Vela, S., de Toro-Martín, J., Mikhaylin, S., Bazinet, L. (2026). Impact of hydrolysis duration and discoloration on peptide profiles and antimicrobial properties in chicken cruor hydrolysates: Identification of five novel antifungal peptides. *Food Chemistry*, 512, 148763.
5. Damen, D., Aboubacar, H., Cournoyer, A., **Bazinet, M.**, De Toro-Martín, J., Gaaloul, S., Hamoudi, S., Cudennec, B., Bazinet, L. (2026). Identification of antihypertensive, antidiabetic, and antioxidant peptides derived from hydrolysates of dairy white

- wastewaters containing milk proteins using machine learning insights. *Food Research International*, 229, 118496.
6. Leblanc, B., **Bazinet, M.**, D'Amours, N., Drouin, A., Germain, P. (2025). Generalization Bounds via Meta-Learned Model Representations: PAC-Bayes and Sample Compression Hypernetworks. In *Proceedings of the 41st International Conference on Machine Learning*, PMLR 267.
 7. **Bazinet, M.**, Zantedeschi, V., Germain, P. (2025). Sample Compression Unleashed: New Generalization Bounds for Real Valued Losses. In *Proceedings of the 28th International Conference on Artificial Intelligence and Statistics*, PMLR 258, pp. 3286–3294.
 8. Sanchez-Reinoso, Z., **Bazinet, M.**, Leblanc, B., Clément, J. P., Germain, P., & Bazinet, L. (2025). Application of machine learning tools to study the synergistic impact of physicochemical properties of peptides and filtration membranes on peptide migration during electro dialysis with filtration membranes. *Separation and Purification Technology*, 360, 130877.
 9. Cournoyer, A., **Bazinet, M.**, Clément, J. P., Plante, P. L., Fliss, I., Bazinet, L. (2025). How peptide migration and fraction bioactivity are modulated by applied electrical current conditions during electromembrane process separation: A comprehensive machine learning-based peptidomic approach. *Food Research International*, 200, 115417.

EXPÉRIENCES ACADÉMIQUES

Oral presentations :

1. **Bazinet, M.**, Zantedeschi, V., Germain, P. Bound to Disagree: Generalization Bounds via Certifiable Surrogates. Présentation orale présentée lors de la conférence Uncertainty In Artificial Intelligence (UAI), 18 au 20 août 2026, Amsterdam (Pays-Bas).
2. Bazinet, L., Durand, R., Hénaux, L., Cournoyer, A., Sanchez-Reinoso, Z., **Bazinet, M.**, Leblanc, B., Bernier, M.-É., Aboubacar, H., de Toro Martin, J., Clément, J.-P., Vohl, M.-C., Ravallec, R., Cudennec, B., Pilon, G., Germain, P., Marette, A. Séparation de peptides bioactifs par électrodialyse avec membrane de filtration : Des applications aux coproduits marins à l'intelligence artificielle. Présentation orale présentée lors du Symposium Tuniso-Canadien sur les produits marins «Enjeux, innovations et opportunités pour une gestion durable», Session 3 «Valorisation des co-produits marins», 15 et 16 avril 2025, Tunis (Tunisie).
3. Bazinet, L., Cournoyer, A., Sanchez-Reinoso, Z., **Bazinet, M.**, Leblanc, B., Bernier, M.-É., Aboubacar, H., de Toro Martin, J., Clément, J.-P., Vohl, M.-C., Ravallec, R., Cudennec, B., Germain, P. Machine learning for bioactive peptide identification and understanding of bio-processes. Présentation orale présentée lors du congrès international GreenFoodTech 2025 «Transformation durable pour l'alimentation de demain», 9 au 11 Avril 2025, Saint-Malo (France).
4. Rahimi, D., **Bazinet, M.**, Sanchez-Reinoso, Z., de Toro-Martín, J., Fliss, I., Mikhailyn, S., Bazinet, L. How hydrolysis duration and discoloration impact peptide population and antimicrobial activities of chicken cruor hydrolysates. Présentation orale présentée lors du symposium étudiants de l'INAF «Alimentation durable : Cultivons notre santé et celle de notre planète», Thème 3 «Peptides et protéines», 19 et 20 Février 2025, Québec (QC).
5. Cournoyer, A., **Bazinet, M.**, Clément, J.-P., Plante, P.-L., Fliss, I., Bazinet, L. Influence of electric current conditions on peptide migration and fraction antimicrobial activities during electro dialysis with ultrafiltration membrane: a comprehensive machine learning-peptidomic study. Présentation orale présentée dans le cadre du congrès OHID- One

Health International Days 2024, Session «Environment as part of One Health», 27-28 Juin 2024, Lille (France).

6. Cournoyer, A., **Bazinet, M.**, Clément, J.-P., Plante, P.-L., Fliss, I., Bazinet, L. Exploring the modulation of peptide migration and fraction bioactivity by electrical current modes during electro dialysis with ultrafiltration membrane: A comprehensive machine learning-peptidomic study. Présentation orale présentée lors du 115^{ème} AOCs annual meeting and expo 2024 «Beyond chemistry : solving complex problems together» co-located with the Sustainable Protein Forum, Session «protein and co-products». 28 Avril au 1^{er} mai 2024, Montréal (QC).
7. Bazinet, L., Cournoyer, A., **Bazinet, M.**, Clément, J.-P., Plante, P.-L., Fliss, I. L'apprentissage automatique pour l'optimisation et la compréhension de procédés en industrie bioalimentaire. Présentation orale présentée dans le cadre de la 8^{ème} édition de la Semaine NumériQc 2024, 8-11 avril 2024, Québec (QC).
8. Laurent Bazinet, Aurore Cournoyer, **Mathieu Bazinet**, Sabita Kadel, Thibaud Geoffroy, Loïc Hénaux. Progrès récents en électrodialyse avec membrane de filtration (ÉDMF) pour la séparation de peptides bioactifs : des applications à la mise à l'échelle.
9. Bazinet, L., Cournoyer, A., **Bazinet, M.**, Kadel, S., Geoffroy, T., Hénaux, L. (2023) Progrès récents en électrodialyse avec membrane de filtration (ÉDMF) pour la séparation de peptides bioactifs : des applications à la mise à l'échelle. Présentation orale dans le cadre de la conférence provinciale PROTEO 2023, 11-12 Mai 2023, Québec, Canada.
10. **Bazinet, M.**, Germain, P. Apprentissage pseudo-Bayésien d'une représentation nouvelle obtenue grâce aux ondelettes. Présentation orale dans le cadre du concours de la relève de la Semaine NumériQc 2023, un rassemblement provincial, 27-31 Mars 2023, Québec, Canada.
11. Bazinet, L., Cournoyer, A., Daigle, G., **Bazinet, M.**, Thibodeau, J. (2022) How to induce selective separation of antimicrobial peptides by electro dialysis with filtration membrane? Présentation orale dans le cadre de la conférence internationale ANTIMIC 2022, 22 au 24 Septembre 2022, Hammamet, Tunisie.
12. Cournoyer, A., Daigle, G., **Bazinet, M.**, Thibodeau, J., Bazinet, L. (2022) Effects of pulsed electric field and polarity reversal on the selectivity of peptides migration during electro dialysis with ultrafiltration membrane. Présentation orale dans le cadre du congrès international MELPRO 2022, 18 au 21 Septembre 2022, Prague, République Tchèque.

Posters :

1. **Bazinet, M.**, Zantedeschi, V., Germain, P. Bound to Disagree: Generalization Bounds via Certifiable Surrogates. Affiche présentée lors de la conference Uncertainty In Artificial Intelligence (UAI), 18 au 20 août 2026, Amsterdam (Pays-Bas).
2. Leblanc, B., **Bazinet, M.**, Nathaniel D'Amours, Alexandre Drouin, Pascal Germain. Generalization Bounds via Meta-Learned Model Representations: PAC-Bayes and Sample Compression Hypernetworks. Affiche présentée à la conférence internationale d'apprentissage automatique (ICML) 2025.
3. **Bazinet, M.**, Zantedeschi, V., Germain, P. Sample Compression Unleashed: New Generalization Bounds for Real Valued Losses. Affiche présentée à la conférence internationale en Intelligence Artificielle et Statistiques (AISTATS), 3 au 5 mai 2025, Mai Khao (Thaïlande).
4. Sanchez-Reinoso, Z., **Bazinet, M.**; Leblanc, B., Clément, J.-P., Germain, P., Bazinet, L. Application of machine learning tools to study the synergistic impact of physicochemical properties of peptides and filtration membranes on peptide migration during

- electrodialysis with filtration membranes. Affiche présentée lors du congrès international GreenFoodTech 2025 «Transformation durable pour l'alimentation de demain», 9 au 11 Avril 2025, Saint-Malo (France).
5. **Bazinet, M.**, Zantedeschi, V., Germain, P. Sample Compression Unleashed: New Generalization Bounds for Real Valued Losses. Affiche présentée au Workshop on Machine Learning and Compression de NeurIPS 2024, 15 décembre 2024, Vancouver, Canada.
 6. **Bazinet, M.**, Zantedeschi, V., Germain, P. Sample Compression Unleashed: New Generalization Bounds for Real Valued Losses. Affiche présentée au Workshop on Mathematics of Modern Machine Learning de NeurIPS 2024, 14 décembre 2024, Vancouver, Canada.
 7. Leblanc, B., **Bazinet, M.**, D'Amours, N., Drouin, A., Germain, P. Sample Compression Hypernetworks: From Generalization Bounds to Meta-Learning. Affiche présentée au Workshop on Machine Learning and Compression de NeurIPS 2024, 15 décembre 2024, Vancouver, Canada.
 8. **Bazinet, M.**, Zantedeschi, V., Germain, P. Sample Compression Unleashed: New Generalization Bounds for Real Valued Losses. Affiche présentée dans le cadre du Montreal AI Symposium 2024, 10 octobre 2024, Montréal (Canada).
 9. Cournoyer, A., **Bazinet, M.**, Clément, J.-P., Plante, P.-L., Fliss, I., Bazinet, L. Influence of electric current conditions on peptide migration and fraction antimicrobial activities during electrodialysis with ultrafiltration membrane: a comprehensive machine learning-peptidomic study. Affiche présentée dans le cadre du congrès AntiMic 2024, Session «Innovative antimicrobial molecules of animal origin», 24-26 Juin 2024, Lille (France).
 10. Cournoyer, A., **Bazinet, M.**, Clement, J.-P., Plante, P.-L., Bazinet, L. (2023) How selective peptide migration is induced by electrical current modes during electrodialysis with ultrafiltration: A comprehensive machine learning-based peptidomic approach. Affiche présentée dans le cadre du Congrès international Bénéfiq 2023, 4-5 octobre 2023 Québec, Canada.
 11. Cournoyer, A., **Bazinet, M.**, Clement, J.-P., Plante, P.-L., Bazinet, L. (2023) Machine learning-based peptidomic approach to identify electrical current modes associated phenomena inducing selective peptide migration in electrodialysis with ultrafiltration membrane. Affiche présentée dans le cadre du Symposium International GreenFoodTech 2023, 18 au 19 Avril 2023, Montréal, Canada.

Proceedings:

1. Cournoyer, A., **Bazinet, M.**, Clément, J.-P., Plante, P.-L., Fliss, I., Bazinet, L. Influence of electric current conditions on peptide migration and fraction antimicrobial activities during electrodialysis with ultrafiltration membrane: a comprehensive machine learning-peptidomic study. Acte de colloque du congrès OHID- One Health International Days 2024, Session «Environment as part of One Health», Lille, France.
2. Cournoyer, A., Daigle, G., **Bazinet, M.**, Thibodeau, J, Bazinet, L. How to induce selective separation of antimicrobial peptides by electrodialysis with filtration membrane ? Acte de colloque du congrès ANTIMIC 2022, 3rd International Symposium on Natural Antimicrobials « Current status, challenges and future perspectives », Hammamet, Tunisie.

ACADEMIC DISTINCTIONS

Doctoral research scholarship 2025-2028 (100 000\$)
Fonds de recherche du Québec – Nature et Technologie

Master’s research scholarship 2024 (20 000\$)

Fonds de recherche du Québec – Nature et Technologie

2nd prize – Young Talent Competition, Semaine NumériQc (1000\$)

At *Semaine NumériQc* 2023, Québec

Prize for Best Solution – Actulab (1000 \$)

At the Actulab competition for the Co-Operators problem, Québec

Departmental Honor Roll in Mathematics and Statistics 2021-2022

Université Laval, Québec, Canada

Departmental Honor Roll in Mathematics and Statistics 2020-2021

Université Laval, Québec, Canada

Departmental Honor Roll in Mathematics and Statistics 2019-2020

Université Laval, Québec, Canada

Special Distinction – Excellence of the mark obtained during the internship

Université Laval, Québec, Canada

EXPERIENCES

Reviewer for conferences

Since 2024

- Reviewer for the following conferences: NeurIPS 2025, AISTATS 2026, UAI 2026 (recognized as Top reviewer).
- Reviewer for workshops: ANNPR 2024, XAI-SA 2024, MAIS 2024, M3L at NeuRIPS 2024, IEE MLSP 35th edition.
- Reviewer for the following journal: Food Research International

Teaching assistant – Directed works

Since 2024

Université Laval, Québec, Canada

- Teach the directed work for the following courses: *Machine Learning for Signal Processing* (IFT-4030/IFT-7030), *Algorithms and Coding / Introduction to Coding* (IFT-1004), *Coding and Mathematics for Data Science* (IFT-4021/IFT-7021), *Initiation to Machine Learning* (IFT-2009).
- Conceiving pedagogical material for the directed works of *Initiation to Machine* (IFT-2009).

Teaching assistant - Grading

Since 2020

Université Laval, Québec, Canada

- Grading for computer science class: *Machine Learning for Signal Processing* (IFT-4030/IFT-7030), *Coding and Mathematics for Data Science* (IFT-4021/IFT-7021), *Initiation to Machine Learning* (IFT-2009).
- Grading for mathematics class: *Mathematics for Engineers II* (MAT-1910), *Vector Algebra* (MAT-0130), *Integral Calculus and Probabilities* (MAT-0250), *Differential Calculus* (MAT-0150), *Arithmetic for Preschool/Primary School Teachers* (MAT-1905).

Teaching assistant - Tutoring

2021-2023

Université Laval, Québec, Canada

- Private tutoring for *Arithmetic for Preschool/Primary School Teachers* (MAT-1905).
- Tutor at the Help Center in Mathematics and Statistics
 - Private tutoring for more than 15 mathematics classes.

SELECTED SKILLS

Spoken and written languages: French (native), English (advanced), German (beginner)

Programming languages: Python (advanced), C++ (advanced), R (advanced), Matlab (intermediate), C# (intermediate), MiniZinc (intermediate), Prolog (intermediate).